

WHAT IS CLAIMED IS:Sul  
B2

1. A method of converting glycerol to 1,3-propanediol in a thermophilic organism, the method comprising:  
 providing a thermophilic organism that ferments glycerol to 1,3-propanediol; and  
 culturing the thermophilic organism under conditions such that 1,3-propanediol is produced.

2. The method of Claim 1, further comprising the step of collecting 1,3-propanediol produced by the thermophilic organism.

Sul  
B3

3. The method of Claim 2, further comprising the step of polymerizing the 1,3-propanediol into a polymer.

4. The method of Claim 3, wherein the polymer is poly(1,3-propylene terephthalate) (PPT).

5. The method of Claim 1, wherein the thermophilic organism is *Caloramator viterbiensis*.

6. The method of Claim 5, wherein the thermophilic organism is derived from the organism deposited as ATCC designation PTA-584.

7. A method of producing 1,3-propanediol from glycerol, the method comprising:  
 incubating glycerol with a thermostable dehydratase enzyme, thereby converting the glycerol to 3-hydroxypropionaldehyde; and  
 adding a reducing agent capable of reducing 3-hydroxypropionaldehyde to 1,3-propanediol.

8. The method of Claim 7, wherein the reduction of the 3-hydroxypropionaldehyde to 1,3-propanediol is catalyzed by a thermostable 1,3-propanediol oxidoreductase.

9. The method of Claim 7 or 8, further comprising the step of collecting 1,3-propanediol.

- 35

22. The isolated culture or cell of Claim 21, wherein the genome of the culture or cell is at least 95% identical to the genome of the organisms deposited as ATCC designation PTA-584.
- 5 23. The isolated culture or cell of Claim 21, wherein the genome of the culture or cell is at least 99% identical to the genome of the organisms deposited as ATCC designation PTA-584.
- 10 24. The isolated culture or cell of Claim 21, wherein the 16S rDNA sequence of the culture or cell is at least 95% identical to the 16S rDNA of the organisms deposited as ATCC designation PTA-584.
- 15 25. The isolated culture or cell of Claim 21, wherein the 16S rDNA sequence of the culture or cell is at least 99% identical to the 16S rDNA of the organisms deposited as ATCC designation PTA-584.
26. The isolated culture or cell of Claim 21 that is a progeny of the organisms deposited as ATCC designation PTA-584.
- 20 27. A method of cloning a polynucleotide sequence that encodes a thermostable glycerol fermentation enzyme, the method comprising:  
hybridizing a polynucleotide probe homologous to a portion of a known glycerol fermentation enzyme gene to a polynucleotide molecule from an environmental sample suspected of containing a thermophilic organism; and  
25 isolating a polynucleotide sequence that binds to the polynucleotide probe.
28. The method of Claim 27, wherein a polymerase chain reaction using a second polynucleotide probe is used to amplify the polynucleotide sequence that binds to the polynucleotide probes.
- 30 29. The method of Claim 27 or 28, wherein the thermostable glycerol fermentation enzyme is derived from a thermophilic organism identified as fermenting glycerol to 1,3-propanediol.
- 35

10042930-101601

30. The method of Claim 29, wherein the thermophilic organism is *Caloramator viterbiensis*.
31. The method of Claim 30, wherein the polynucleotide probe is homologous to a portion of a known dhaB gene.
32. The method of Claim 31, wherein the dhaB gene is from *Klebsiella*.
33. The method of Claim 29, wherein at least one polynucleotide probe is selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:5 and SEQ ID NO:6.
34. The method of Claim 33, wherein the polynucleotide probe and the second polynucleotide probe are SEQ ID NO:1 and SEQ ID NO:2.
35. The method of Claim 33, wherein the polynucleotide probe and the second polynucleotide probe are SEQ ID NO:5 and SEQ ID NO:6.
36. A method of cloning a polynucleotide sequence that encodes a thermostable glycerol fermentation enzyme, the method comprising:  
transforming a target organism that cannot grow anaerobically on glycerol with DNA from a thermophilic organism; and  
identifying those transformed target organisms that contain the polynucleotide sequence that encodes an enzyme that ferments glycerol to 1,3-propanediol by their anaerobic growth on glycerol.
37. The method of Claim 36, wherein the thermostable glycerol fermentation enzyme is derived from a thermophilic organism identified as fermenting glycerol to 1,3-propanediol.
38. The method of Claim 37, wherein the thermophilic organism is *Caloramator viterbiensis*.
39. The method of Claim 38, wherein the *Caloramator viterbiensis* is derived from the organism deposited as ATCC designation PTA-584.

1004230.0301  
T08T0T "065400T

40. A method of isolating a thermophilic organism that catalyzes the fermentation of glycerol to 1,3-propanediol, the method comprising:  
 incubating a sample containing thermophilic organisms in media containing glycerol as the primary carbon source; and  
 5 isolating at least one thermophilic organism that ferments glycerol into 1,3-propanediol.
41. The method of Claim 40, wherein the sample is incubated at a temperature in the range of about 40°C to about 100°C.
- 10 42. The method of Claim 40, wherein the sample is incubated under anaerobic conditions.
43. The method of Claim 40, wherein the sample is obtained from a natural source  
 15 having a temperature of between about 50° to about 100°C.
44. The method of Claim 40, further comprising the step of detecting production of 1,3-propanediol by the thermophilic organism.
- 20 45. The method of Claim 40, further comprising the step of determining the production of acetate by the thermophilic organism.

25

ALL A3

30

35